Investigate New Patterns of Behavior among Young People an Empirical Analysis on Food and Fish

Andrea Rocchi
Coris- Sapienza University of Rome, Italy

Abstract
In order to investigate new drivers of consumption development of fish products by young people, this paper aims to take place actions in order to promote and exploit short supply chains and fishery products at zero food miles, increasing awareness and sustainability levels in this sector. The project is oriented towards future students, parents and teachers. Students are the protagonists of edutainment initiatives and will be leveraged towards parents who will in turn convey the notions to other adults through activities to be carried out together, with media relevance. The activities raise awareness of the sustainability of the fish supply chain, promote the spread of local products and activate short supply chain mechanisms, enabling them to be strengthened.

This job presents comments and results deriving from the empirical investigation made with web based system and SPSS software. Data analysis shows a widespread knowledge of the main fish species, but a lack of knowledge of the niche species that characterize our seas. The paper is divided into five sections. After the introduction, the second section offers a theoretical background of Edutainment and Gamification, the third section explains the research method, namely the game construction, while section four provides a description and discussion of the research findings. In the fifth section, final remarks research directions are addressed.

Keywords
Edutainment; Gamification; Sustainability; Technology

1. Introduction
The paper is the conclusion of a relevant national project carried out by the Research Centre of the Sapienza University of Rome on behalf of Ministry of Agriculture and Forestry Policies. First of all, we used an innovative, technological and narrative method to investigate a specific pattern. The study is used to understand fishery market and consumption by young generation in Italy and to demonstrate the role of the game in this analysis. The aim of the project is to promote short supply chains and fishery products at zero food miles, increasing awareness and sustainability levels in this sector. Short supply chains are focused on valorization aspects such as the quality, country of origin and sustainability of products, instead the traditional supply chains focus on productivity, standardization and industrial organization goals. Environmental and economic sustainability could be assured by the smaller presence of intermediaries between producers and consumers and the local dimension of production and transformation. Production and consumption profiles, minimizing transport, significantly
contribute to pollution, promote the development of local economies, increase employment, and protect local traditions. Thus, the short supply chain identifies a particular form of fishery products marketing, improving the environment, maintaining biodiversity, respecting traditions and favoring local economies. The project is oriented towards future students, parents and teachers. The students are the protagonists of edutainment initiatives and will be leveraged towards parents who will in turn convey the notions to other adults through activities to be carried out together, with media relevance. The activities raise awareness of the sustainability of the fisheries supply chain, promote the spread of local products and activate short supply chain mechanisms, enabling them to be strengthened. Starting with young people and all involved parties, they will have a leverage effect and everyone’s decisions will affect market choices at every level. The project will provide the necessary tools to make sustainable and conscious choices across the entire supply chain: from purchase, to retail and wholesale, and above all to fisheries/livestock up to the level of “environmental and biodiversity protection”.

2. Edutainment and Gamification

We have chosen to present literature review following the strands of research under the denomination of Edutainment and Gamification, in order to answer to the research questions addressed: 1. Can students be aware of the sustainable fisheries supply chain by promoting the diffusion of local products? And, if yes, 2. Which are the best ways to train schoolchildren?

The “modern” education process is characterized by increasing information and rapid development of technologies facilitates new leisure activities [1]. To date, the cognitive learning process does not develop into a formal environment, but into a healthy entertainment with the acquisition of simultaneous knowledge. The edutainment is the concept of education and entertainment. The “Educational fun” is used to identify new forms of educational teaching based on the game. Edutainment supports the process of intercultural education [2], within an educational project, subjects belonging to different cultures interact with each other in order to overcome “monoculturalism”, facilitating the empathy. Through the game, children discover the reality surrounding them, enabling experimentation of new skills. In the literature review, Addis [3] was one of the first authors to define edutainment as a new form of interactive pedagogy that qualifies the learning process as a fun experience. Education in the computer environment is a subset of computer games with the price structure, and is part of the training experience in the games [4]. Buckingham and Scanlon [5] define edutainment as a “hybrid” based on visual material in the form of stories and/or games, less tied to the didactic style. The authors argue that edutainment is an interesting combination of traditional content and teaching methods in the context of new technologies. The purpose of education in the computing environment is to attract the learners’ attention by connecting their feelings to computer monitors with colorful animations [6]. Tüzün, et al. [7] consider today’s teaching methods as more focused on students, emphasizing the role of students in the teaching methods. In addition, computer games can be used as effective tools in teaching complex topics, stimulating and increasing the motivation of students in the classroom. Okan [8] states that the purpose of this education process is to attract and retain students’ attention in order to balance their emotions and feelings through the use of an animated monitor that is rich in vibrant colors, in this way the learning process becoming interactive, exciting and entertaining. The instruments to applying and developing edutainment are the new technologies that translate into interactive multimedia systems, or virtual-based technologies based on real time interactive 3D graphics systems [3]. Virtual reality is defined as an integrated IT system that allows users to create, display and interact with a simulated and reproduced world. It also allows users to feel immersed in the environment through stereographic and tactile interfaces [9]. In particular, interactive technologies have two essential characteristics: interactivity and virtual concretization. Interactivity is defined as the ability to respond to user inputs by manifesting in the choice of topics of interest. The second concerns the ability to concretize the content of the message transmitted in a virtual environment. This is closely tied to the multimedia technology, integrating different communication media. Multimedia allows access to various information (data, text, video, images, animations, sounds) permitting an expression of the most powerful concepts over traditional tools. By applying new technologies to edutainment, the convergence between education and entertainment is strengthened, improving flexibility and achieving important results that affect the evolution of technology, such as speed, interconnection and graphic resolution. The developments related to the content of the message originate two effects: Education and
Entertainment Content [3]. Using multimedia with a new virtual environment construction, the educational message content is realized, that it enhances the entertainment content. Thus the message is therefore recognizable by more individual senses, increasing multisensorship and the user has the opportunity to receive much higher knowledge [10]. Shaping the message with multimedia and multisensoriality allows to recreate content that is part of a new virtual environment where interaction with the individual occurs, which can be defined as the Virtual Edutainment Environment. According to Addis [3] the Virtual Edutainment Environment is the environment in which one or more individuals encounter the actualization of the message. In this context, the users can interact with each other, but it is essential that information is elaborated in a single and complex way, exploiting the multimedia of the technology tools to strike the individual’s multisensorship. The need to use an ex novo definition to indicate this virtual education and entertainment environment, is justified by the specifics of the concept. The Virtual Edutainment Environment is translated as an engaging experience, and the user’s relationship is defined as “edutainment experience immersion”, an emotion experienced by the individual when he is actively participating. This characterizes the “learning immersion”, a sense of interest that the individual experiences in a new knowledge acquisition situation. The “Learning immersion” is a concept that is part of the “edutainment experience immersion”. However, there are considerable differences as “learning immersion” refers to the relationship between the user and the educational message, “edutainment experience immersion”, instead is relevant to the whole situation. This is the Virtual Edutainment Environment. Okan [8] argues that education concerns the development of cognitive structures and that technology is a means, not a pedagogy, useful in creating such learning environments. Although the convergence between education and entertainment is supported by the diffusion and creative use of technology, all this entails a risk, perhaps characterized by the vulnerability of the system itself. Researchers and industry experts raise questions and criticisms about this form of modern education. The widespread feeling that educators have no choice but to accept and use the new methodologies and technologies despite being not confident with them, the investments that the classes have to support to provide the classrooms of the right equipment, and finally a danger that children have a limited view of learning, with the risk of being perceived only as mere fun and entertainment. The use of available technology and instrument has influenced practice in educational systems. It is difficult to explain the current position of technology in education systems or it is increasingly difficult to predict what its integration will be in the future. However, education institutions continue to make educational reforms and invest in unpredictable technologies nowadays [11, 12].

Does a relationship between theories and applications of Edutainment and Gamification exist? The connection could be expressed by a common element: game, a major variable during “modern” learning and education processes. Huizinga [13] and Callois [14] study a recreational component in the ordinary and extraordinary life of the individual. The authors, although in different historical moments, come to the same conclusion, the game is a primary need of individual and this is the natural assumption that led to the gamification. In the international literature, authors such as Deterding, Khaled, Nacke and Dixon [15] define gamification as elements, dynamics and game mechanics in contexts other than game, highlights the need to improve engagement and the commitment of the individual to non-recreational activities. A necessary but not sufficient condition for the growth of gamification is the development of technology, telecommunications networks. Among the multiple and heterogeneous application fields, gamification is referred to contexts where it encourages and it promotes learning process. Several empirical investigations [16] found the concentration capacity and learning outcomes are increased in the university and primary schools, highlighting positive effects of gamification processes. The World Education Forum [17] stipulated that the aim of the planet is to “improve all aspects of the education quality, by ensuring adequate excellence”. In order to encourage students to study, the concept of Digital Game Based Learning (DGBL) was theorized, which is component of the Educational Game tools, as a variation in the use of games in educational environments, useful to promoting collaboration, cooperation and learning [18]. In particular, the (DGBL) is characterized by three important conditions:

- Situated Learning
- Activity Theory
- Experential Learning

In the Situated Learning the games provide information in a framework well-defined, where learning
takes place through social interaction between individuals. In the Activity Theory the games allow the students to experiment solutions, in addition, through Experiential Learning, the students learn by doing. Game-based learning studies have analyzed the criticalities and cases in which the use of system has been successful and results have been better than the previous ones. Particularly, there have been effects on the increase in practical activities and support situations for pre-adolescent education. Several experiments carried out on elementary school children have shown the teachers adopt a “modern” educational didactics, using the combined game tools in the digital environment, the children received much more information, becoming flexible in learning of concepts totally different from each other. Therefore, the development of Game-Based Learning systems has enabled the knowledge and experimentation of new learning forms, achieving improved results in terms of effectiveness and efficiency.

3. Game Construction

In order to involve secondary school students, a first phase of experimentation were planned at the follow Institutes: “Via Ceneda”, “Nelson Mandela”, “Tullia Zevi” and “A. Manzoni (Via Lusitania)”. Schools with a pool of heterogeneous users have been involved in order achieve a real validation of the city context. Experimentation activities through the game are involved a sample of 650 students of secondary school. The main purpose of the project is to disseminate local fishery products in the education field. The econometric criteria of information/communication are identified. The data collected refer to the implications of the game in terms of information, education and communication. The game has been structured to be captivating, educative, formative and inclusive. In particular, all the participants carried out activities in order to achieve the goals of continuous improvement, associating educational information with each choice. Players can make choices along supply chain, through the storytelling principles. In general, the game is structured according to the following process:

- The child/player prepares dinner for his family. To do this has a budget in Euro and Lives.

- The player will begin his adventure along the supply chain will become the protagonist at every stage: buyer, fisherman, carrier agent, trader, chef.

- The player will have to choose which fish to fish and, depending on the option, the budget and the lives will change.

- Choosing the fish there is an activity to associate species to the right scientific name.

- The child starts his itinerary along the supply chain, becoming a fisherman.

- Among the fishing options the minimum dimension fish to caught is presented.

- After the fishing technique the player becomes a carrier agent, choosing storage conditions and the max distance of transportation.

- In the final phase, the player will be the protagonist of the transformation phase. Students will find themselves in the kitchen at home and can choose between the different recipes available and prepare the dish.

- In addition to curiosity, other learning notices (e.g. food waste, waste disposal, nutrition information) will be provided.

- Completing the game, the students/players will have maintained, enriched or impoverished the budget and the lives.

Questions have been associated with a degree of difficulty: from 1 (less difficult) to 3 (harder), in order to create different levels within the game. Response options have been catalogued based on their correctness, based on a importance system. To the answer always accurate the score is “+1”; the incorrect answer the score “-1” is corresponded; a response not correct but not wrong the score “0” is associated.

From a technical point of view, the web software was developed with Microsoft Visual Basic 6 sp.6 and requires Windows XP, Vista, 7, 8 or 10 operating systems. The program sends the data on the progress of the game using a secure connection ssh to the server hosting the website. The data contains the nickname of the player, his current score, the date of his first game, the number of
games played and the number of times the game has been completed.

4. Results and Discussion

A great student participation is highlighted; in order to monitor the trends and results of the portal, the first statistics and access statistics were also examined. Main results reveal, in addition to the great participation, the considerable interest of young people in the theme of food and fish.

To acquire cognition about the students’ knowledge, improving the game structure and the sessions training, exploratory questionnaires are administered. The survey is composed by eleven questions, two questions are open answer and nine with multiple choice. The questionnaire collects following information:

- Gender
- Number of family members
- Fish food habits
- Fish consumer behavior
- Information related to the choice
- Knowledge of fish various species
- Learning opportunities

The survey used an ad hoc questionnaire developed as an investigative tool. A preliminary test was carried out on a small set of units in order to sharpen the questions. The survey involved a sample of 650 students. The questionnaire response took place outside of the classroom, often at home and for this reason some of the results may be affected by any stresses received at home. (Figures and Tables as per the word file)

#### Question 1: Gender

![Gender Chart]

<table>
<thead>
<tr>
<th>Gender</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>325</td>
</tr>
<tr>
<td>Female</td>
<td>325</td>
</tr>
</tbody>
</table>

Over 53% of households is composed by four people, it is presumed that this suggests that interviewing families are made up of two parents and two children.

#### Question 2: Number of Family Members

<table>
<thead>
<tr>
<th>Number of Family Members</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two</td>
<td>23</td>
</tr>
<tr>
<td>Three</td>
<td>120</td>
</tr>
<tr>
<td>Four</td>
<td>349</td>
</tr>
<tr>
<td>Five</td>
<td>107</td>
</tr>
<tr>
<td>&gt; Five</td>
<td>49</td>
</tr>
<tr>
<td>No Answer</td>
<td>2</td>
</tr>
</tbody>
</table>

Over 53% of households is composed by four people, it is presumed that this suggests that interviewing families are made up of two parents and two children.

#### Questions 3: How many times do you eat fish in a week?

The question aiming to identify the number of weekly opportunities for fish consumption.

The sample considered involve students who did not use the school canteen service.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>All the Days</td>
<td>2</td>
</tr>
<tr>
<td>Once a Week</td>
<td>359</td>
</tr>
<tr>
<td>Twice a Week</td>
<td>240</td>
</tr>
<tr>
<td>No Consumption</td>
<td>44</td>
</tr>
<tr>
<td>No Answer</td>
<td>5</td>
</tr>
</tbody>
</table>

Data shows how the consumer profile is geared toward a weekly occasion over 55%, while 36% twice a week. These consumption outcomes only concern household consumption.
Question 4: Where do you eat fish?
Taking into account the mode of questionnaire administration and considering the failure to use school canteen service, the total number of respondents replies that the opportunity for consumption happens at home.

Question 5: Why do you eat fish?
This question clarifies the motivations that drive students (and families) to the fish consumption. The students provided more than one answer.

Question 6: Do you know where the fish is bought?

More than 48% of respondents claim purchasing is done in a specialized stores, followed by supermarkets.

Question 7: What is purchased?
The question to clarify which product type was purchased by the respondents’ families.

Below the results.
Question 8: You would like to learn more about...

The question intends to explore the potential issues of interest to be studied.

The topics of greatest interest are product origin (42%) and production method (30.2%). This data suggests that the actions introduced by the project find space because they consider sensitive topics for consumers of the future.

Question 9: Which are the various species known?

The question asks which are the fish various species known to kids. The answers are shown in the following chart.

From the analysis of the data it is possible to observe about 30 species known by the sample, the first 10 species represent over 55% of total answers. The qualitative data analysis highlights that among the most well-known species there are no niche species, typical of our territory. On the one hand, it highlights the inclusion of other species such as molluscs, mussels, crustaceans and other aquatic animals; on the other hand, knowledge of freshwater species such as the pike and the carp.
According to the findings, the students would like to deepen the issues related to fishing, sustainability and niche fishing at the school (41.6%) or television (25.9%) or through a cooking class (17.3%).

**Question 11:** Where would you like to explore some of these issues with your parents?

The question try to realize which edutainment opportunities could be developed in the future.

According to the findings, the students would like to deepen the issues related to fishing, sustainability and niche fishing at the school (41.6%) or television (25.9%) or through a cooking class (17.3%).

**5. Conclusion**

Data collected demonstrates a widespread knowledge of the main fish species, but a lack of knowledge of the niche species that characterize our seas. In particular, data analysis show the gender equally distributed (50% male and 50% female). About 54% of families is composed by four component, over 55% of respondents eats fish once a week and the 50% eats fish for the reasons of healthy and varied diet. Over the 70% of respondents purchases the fish products in a fish market or supermarket, only 2% in a weekly market. Over the 70% of students declared that the fish product purchased is caught or frozen. The Origin (42%) and Production Method (about 30%) are the issues of increased interest during the fish purchasing assessment process. The findings highlight a widespread knowledge of the main fish species, but a lack of knowledge of the niche species that characterize our seas. Among the students there is a confusion of the name “fish”, which identifies only one category of shellfish and crustaceans, in addition to the fish. However tuna, swordfish, cod, salmon, sole and trout, are the most popular species of students who answered the questionnaire. Finally, about 70% of the respondents state that the “aspect” is the main item used to recognize the freshness of the fish. Therefore we attempt to answer our two research questions, declaring that the students are aware of the sustainability of the fisheries
supply chain by promoting the diffusion of local products, shaping new consumer patterns through Edutainment and Gamification.

**References**


